DAYLIGHT REPORT

PENTHOUSE FLATS

97-99 MONTAGUE STREET

WORTHING

VERSION 01

SEPTEMBER 2025

Company Registration No: 10354408

CLIENT: Moretons Investments Ltd

CONSULTANT:

XDA Consulting Ltd
Unit 2 Turner Dumbrell Workshops
Dumbrells Court Road
East Sussex
BN6 8GT

Tel: 01273 916904
Email: hello@xdaconsulting.co.uk
Website: www.xdaconsulting.co.uk

PROJECT NAME: Penthouse Flats 97-99 Montague Street Worthing

PROJECT REFERENCE: X310

Version	Date	Description of changes	Author	Checked by
01	23.09.2025	First issue	DP	DB

CONTENTS

1 INTRODUCTION

The design proposals for 97-99 Montague Street, Worthing include a single storey upwards extension to the existing building to create the addition of 4no. penthouse flats.

This report has been prepared by XDA Consulting Ltd to evaluate any impact on the adjacent residential properties along with assessing the Internal daylight levels to the proposed penthouse flats.

The daylight, sunlight and overshadowing has been assessed for windows of the adjacent properties 10-18 Prospect Place.

The daylight study has been undertaken by Danielle Price using dynamic modelling software IES Virtual Environment 2024.

2 ASSESSMENT CRITERIA

The criteria used for assessment of impacts on daylight, sunlight and overshadowing to existing dwellings of a proposed development are taken from the BRE Guidance document "BR 209: Site Layout Planning for Daylight and Sunlight, a Guide to Good Practice, 2022".

2.1 DAYLIGHT

The BRE guidance includes a decision chart on the process for accessing daylight impacts, see Figure 2.1. This report shall assess the Vertical Sky Component of adjacent properties, and if necessary the No Sky Line.

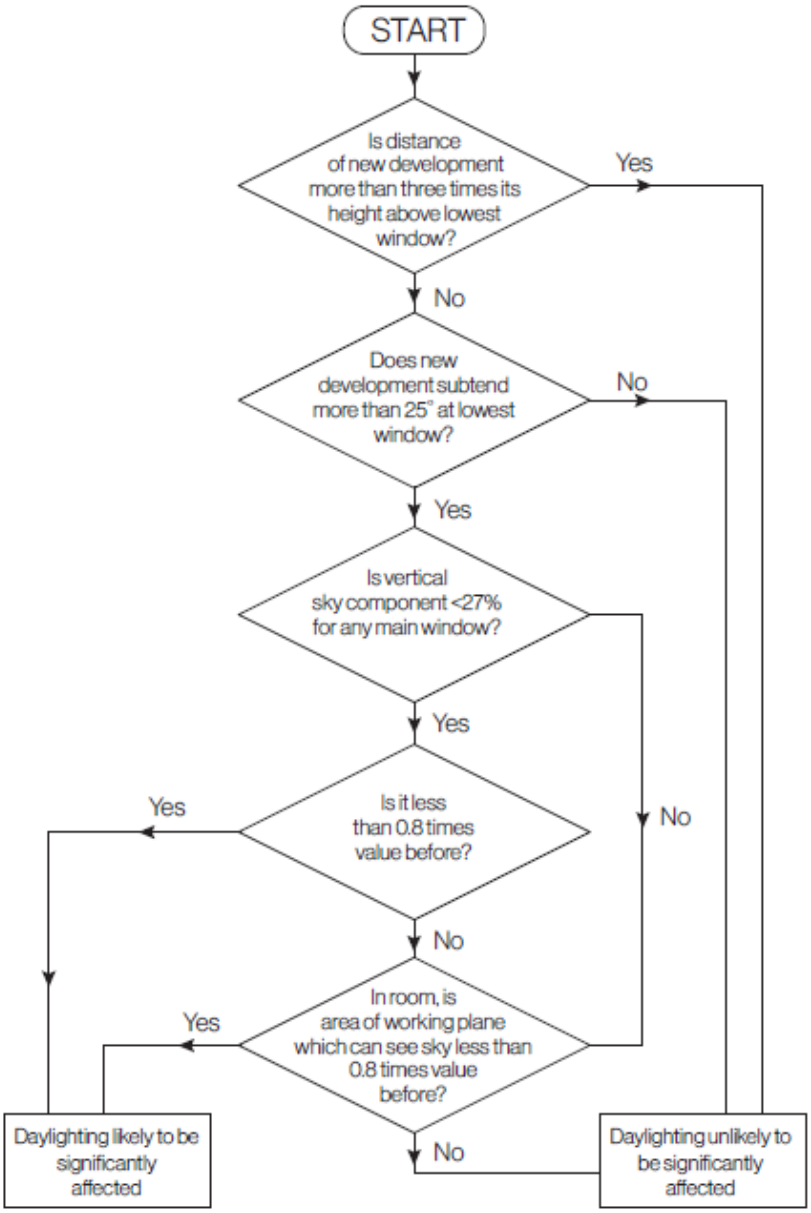


Figure 2.1 BRE Decision chart: diffuse daylight in existing buildings

2.1.1 Vertical Sky Component

The amount of skylight that reaches the windows is assessed by determining the Vertical Sky Component (VSC). The vertical sky component is the ratio of direct sky light that reaches a vertical plane (wall or window) to the amount of sky light that reaches the horizontal plane (the ground). This ratio is expressed as a percentage. The maximum VSC that could be achieved for a completely unobstructed window/wall is almost 40%.

When assessing the impact of a new development on existing buildings the BRE guidance suggests that if with a new development, an existing window has a VSC greater than 27% it should still receive sufficient skylight. If the VSC is reduced below 27% and less than 0.8 times its former value, then the occupants are likely to notice the loss of skylight.

2.1.2 No Sky Line

The impact on daylight distribution within existing rooms can be determined by plotting the No Sky Line (NSL) in each of the main rooms. Typically this includes living rooms, dining rooms and kitchens. Bedrooms can also be analysed although these are less important.

The NSL divides points on the working plane that can and cannot see the sky. The working plane in domestic properties is 0.85m high. The BRE guidance outlines that if with a new development the NSL moves so that the area of the existing room which does receive skylight is reduced to less than 0.8 times its former value this will be noticeable to the occupants and more of the room will appear poorly lit.

2.2 ANNUAL PROBABLE SUNLIGHT HOURS

The BRE guidance summarises that a dwelling shall appear reasonably sunlit if the centre of a main living room window can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in winter months between 21st September and 21st March.

When considering the impact of a development on an existing dwelling, the sunlight to the existing dwelling may be adversely affected if:

- receives less than 25% of annual probable sunlight hours and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;

- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

2.3 OVERSHADOWING

The BRE guidance states that the sunlight to a garden will be adversely affected if both of the following criteria are infringed upon:

1. The area of garden that can receive 2 or more hours of direct sunlight on 21st March is reduced to below 50% of the total area.

2. The total area of the garden that can receive 2 or more hours of direct sunlight on 21st March is reduced by 20% or more of the existing value as a result of the proposed development.

Therefore, where less than 50% of the garden is found to receive direct sunlight for at least 2 hours as a result of the development and the total area that still receives direct sunlight is less than 80% of the former value the garden is considered to be overshadowed.

2.4 INTERNAL DAYLIGHT

The BRE guidance document refers to the British Standard 'Daylight in Buildings' EN 17037:2018 which contains advice and guidance on interior daylighting. It states a space is considered to provide adequate daylight if a target illuminance level is achieved across a fraction of the reference plane within a space for at least half of the daylight hours. For spaces with vertical or inclined daylight openings, a minimum target illuminance level is also to be achieved across the reference plane. The reference plane of the space is located 0.85m above floor level.

BS EN 17037 gives three levels of recommendation for daylight provision in interior spaces: minimum, medium and high, see Table 2.1. For compliance with the standard, a daylit space should achieve the minimum level of recommendation.

Level of recommendation	Target Illuminance E_T lux for 50% assessment grid	Target Illuminance E_{TM} lux for 95% assessment grid
Minimum	300	100
Medium	500	300
High	750	500

Table 2.1 Values of target illuminance from daylight over at least half of the daylight hours

The UK National Annex of BS EN 17037 gives specific recommendations for habitable rooms in dwellings in the UK. These are intended for 'hard to light' dwellings, for example in basements or with significant external obstructions such as a dense urban area or with tall trees outside. They could also apply to existing buildings being refurbished or converted into dwellings. The National Annex NA.2 recommends that the target illuminances in Table 2.2 are exceeded over at least 50 % of the points on a reference plane 0.85 m above the floor, for at least half of the daylight hours.

Room Type	Target Illuminance E_T lux for 50% assessment grid
Kitchen	200
Living Room	150
Bedroom	100

Table 2.2 Values of target illuminance for room types in UK dwellings required in BS EN 17037:2018 NA.2

3 METHODOLOGY

IES Virtual Environment 2024 was used to produce 3D model geometry of the proposed development and surrounding buildings.

The Radiance module in the IES Virtual Environment (VE) software was used to undertake climate-based daylight modelling and calculate spatial daylight autonomy (sDA) to determine the internal daylight illuminance results. The radiance module was also used to calculate the Vertical Sky Component (VSC). The VSC calculation uses the standard CIE overcast sky.

The SunCast module in IES VE was utilised to produce a solar exposure calculation to determine the number of hours each day a window receives sunlight from the sky. These results were then used to calculate the Annual Probable Sunlight Hours.

4 3D MODEL

The 3D model geometry of the Proposed Development was constructed based on the following architectural drawings provided by BPM Architectural Services Ltd:

- 3110.05 Proposed First Floor Plan
- 3110 97 – 99 Montague Street BN11 3BN

Drawings provided by SeSurveying:

- 007 06 25 003 – Elevations
- 007 06 25 004 – Elevations
- 007 06 25 No.97-99 Montague Street, worthing BN11 3BN (2004)
- 007 06 25 No.97-99 Montague Street, worthing BN11 3BN – Rev A (2004)

Axonometric images of the model are presented in Figure 4.1 to Figure 4.5 with the site orientation presented in Figure 4.6. The adjacent buildings have been taken into consideration within the calculations in order to account for any light obstructions.

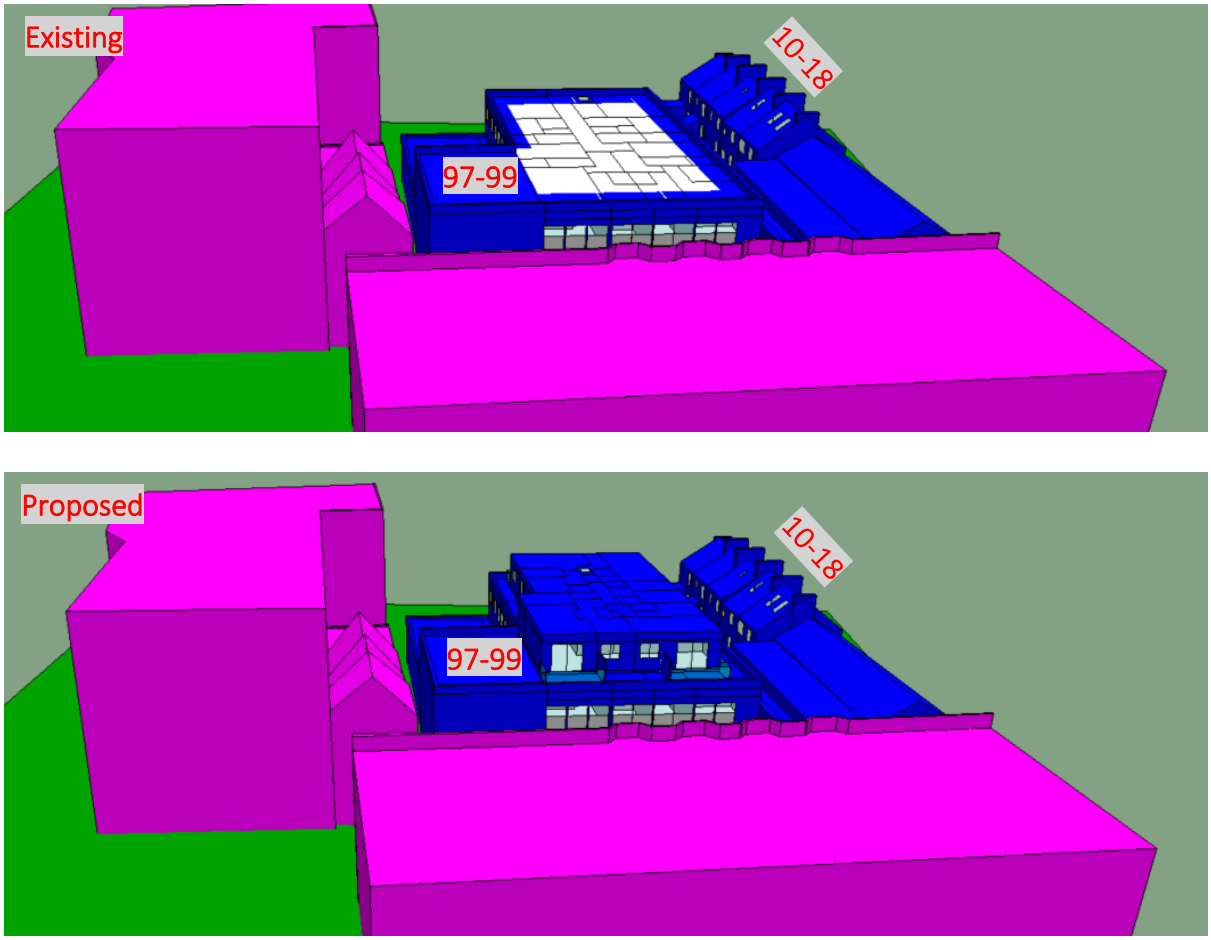


Figure 4.1 Existing & proposed development with adjacent properties – view from north

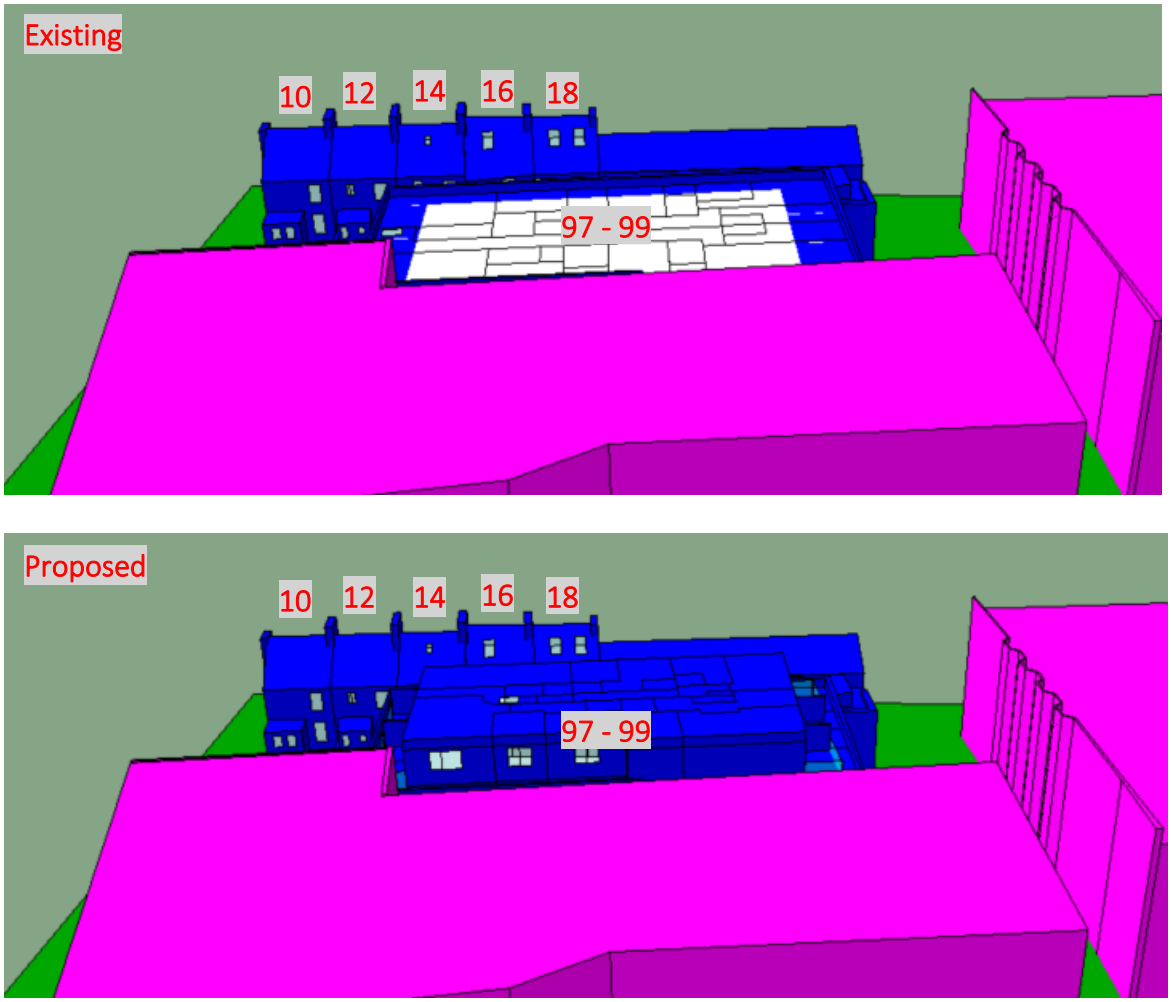


Figure 4.2 Existing & proposed development with adjacent properties – view from east

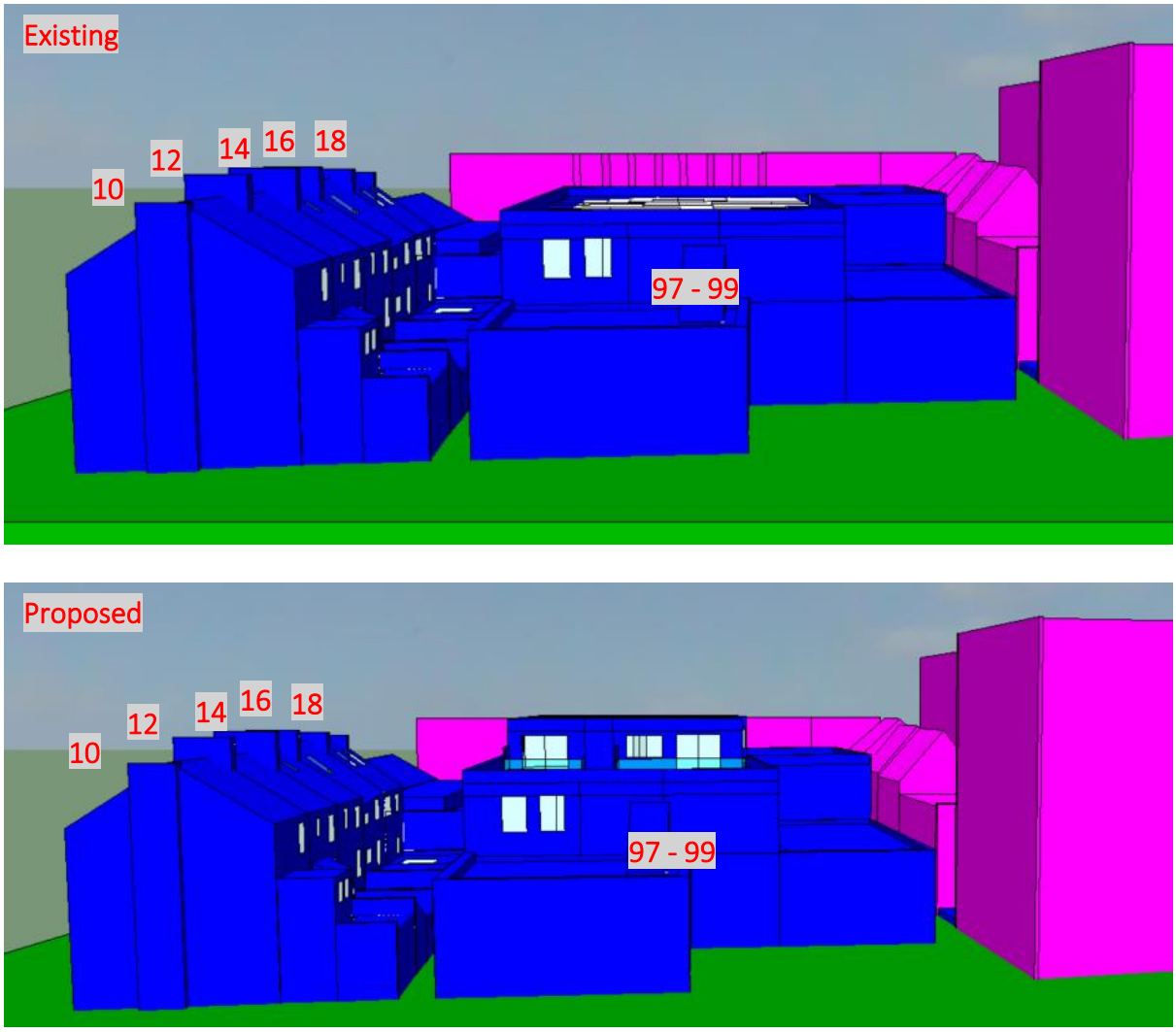


Figure 4.3 Existing & proposed development with adjacent properties – view from south

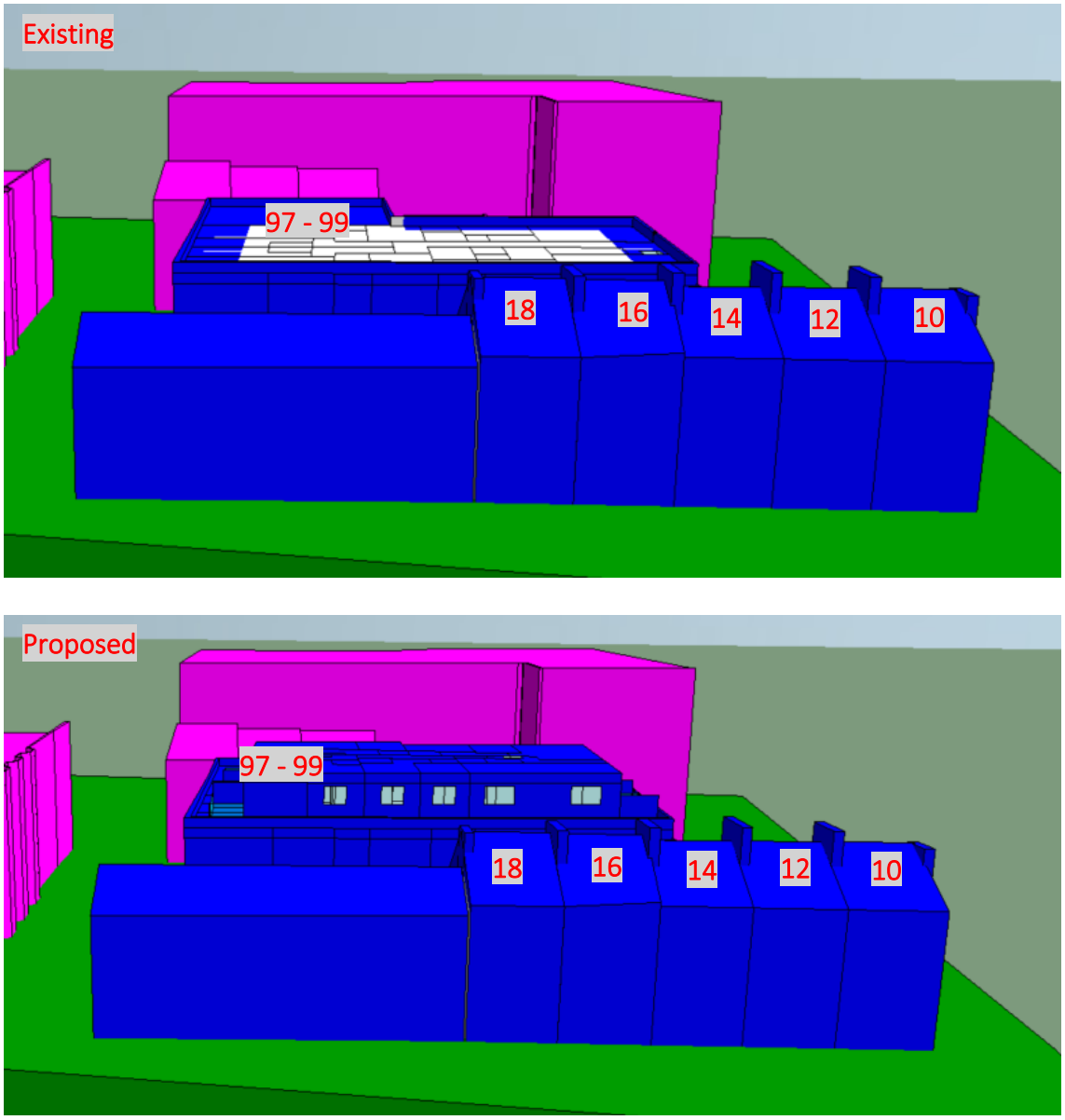


Figure 4.4 Existing & proposed development with adjacent properties – view from west

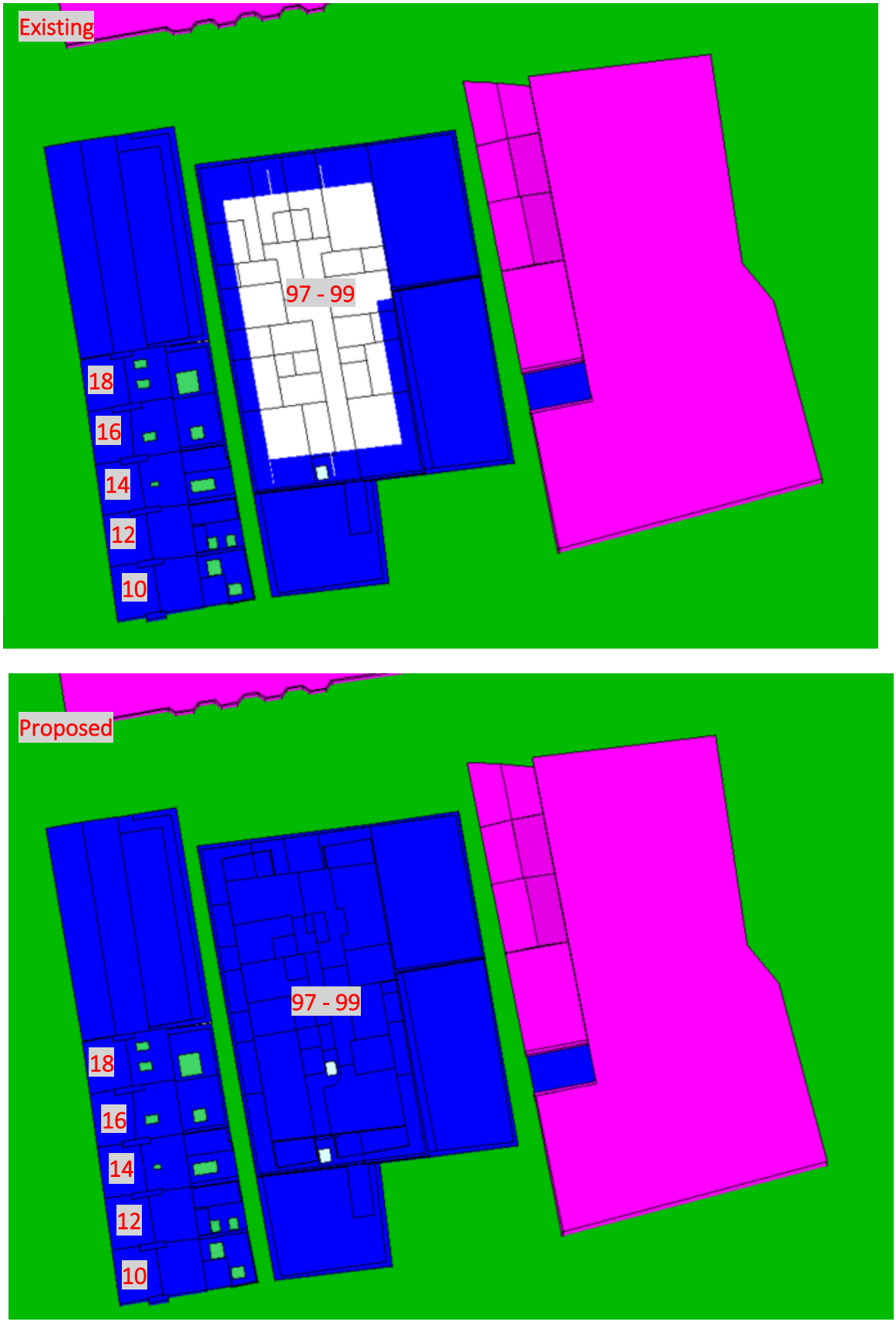


Figure 4.5 Existing & proposed development with adjacent properties – view from above

Figure 4.6 Site plan showing orientation of building model – note existing & proposed are overlaid

5 RESULTS & DISCUSSION

5.1 DAYLIGHT

5.1.1 Vertical Sky Component

The BRE guidance states that if with a new development, an existing window has a VSC greater than 27% it should still receive sufficient skylight. If the VSC is reduced below 27% and less than 0.8 times its former value, then the occupants are likely to notice the loss of skylight.

The windows on the rear elevations of the following properties are being assessed:

- 10 Prospect Place
- 12 Prospect Place
- 14 Prospect Place
- 16 Prospect Place
- 18 Prospect Place

The BRE guidance notes that only occupied spaces such as kitchens, bedrooms and living rooms need to be assessed for daylight. As the internal layouts are unknown, all windows have been assessed.

The VSC results are presented in Table 5.1 with the window references given in Appendix 1.

Property	Window No.	Existing VSC	Guidance met currently?	80% VSC Threshold	Proposed VSC	Reduced below 27%?	Reduced beyond threshold?	BRE guidance met
10 Prospect Place	1	32.9	✓	26.4	32.3	No	No	✓
10 Prospect Place	2	31.8	✓	25.5	31.5	No	No	✓
10 Prospect Place	3	34.8	✓	27.9	33.8	No	No	✓
10 Prospect Place	4	23.9	✘	19.1	23.6	N/A	No	✓
12 Prospect Place	1	27.2	✓	21.8	27.5	No	No	✓
12 Prospect Place	2	27.2	✓	21.7	26.9	Yes	No	✓
12 Prospect Place	3	34.4	✓	27.5	33.0	No	No	✓
12 Prospect Place	4	32.7	✓	26.2	31.1	No	No	✓
12 Prospect Place	5	23.7	✘	19.0	23.0	N/A	No	✓
12 Prospect Place	6	11.7	✘	9.4	11.7	N/A	No	✓
14 Prospect Place	1	32.1	✓	25.7	29.4	No	No	✓
14 Prospect Place	2	30.1	✓	24.1	26.7	Yes	No	✓
14 Prospect Place	3	21.4	✘	17.1	20.4	N/A	No	✓
14 Prospect Place	4	7.5	✘	6.0	7.6	N/A	No	✓
16 Prospect Place	1	28.0	✓	22.4	24.3	Yes	No	✓
16 Prospect Place	2	28.5	✓	22.8	24.0	Yes	No	✓
16 Prospect Place	3	20.2	✘	16.2	18.7	N/A	No	✓
16 Prospect Place	4	18.9	✘	15.1	17.1	N/A	No	✓
18 Prospect Place	1	27.9	✓	22.3	23.1	Yes	No	✓
18 Prospect Place	2	27.7	✓	22.2	22.5	Yes	No	✓
18 Prospect Place	3	14.7	✘	11.8	13.6	N/A	No	✓

Table 5.1 VSC results

10 Prospect Place

No noticeable impact. There are four windows that serve the rear of the property that have been assessed. Three of the windows have no noticeable impact and the fourth is already below recommended 27% VSC threshold. This window will only be reduced by 0.3% so there will also be no noticeable impact.

12 Prospect Place

No noticeable impact. There are six windows that have been assessed for this property. Window 2 will be reduced by 0.1% below the 27% threshold, but it will not reduce beyond the 80% and therefore there will be no noticeable impact. Windows 5 and 6 are already below the BRE 27% VSC. Window 5 will be reduced by 0.7% and window 6 will not be reduced, both windows even with their reductions will not be reduced beyond 0.8 times the former value and therefore will not be noticeable.

14 Prospect Place

No noticeable impact. There are four windows being assessed that serve the rear of the property. Window 2 will be reduced 0.3% below the 27% but this will not be reduced beyond 0.8 times the former value and therefore will not be noticeable. Windows 3 and 4 are both already below the 27% threshold but they will also not be reduced beyond 0.8 times the former value and therefore will not be noticeable.

16 Prospect Place

No noticeable impact. Two of the four windows that have been assessed for this property will see a small reduction on their VCS. Window 1 will be reduced by 3.7% and window 2 will be reduced by 4.5% bringing both windows below the 27% threshold. Although this is the case, they will not be reduced beyond 0.8 times the former value and therefore there will be no noticeable impact. Windows 3 and 4 are both already under the recommended 27% threshold but again they will not be reduced beyond 0.8 times the former value, ensuring that there will be no noticeable impact.

18 Prospect Place

No noticeable impact. Three windows have been assessed for impact on this property. Window 1 will be reduced below the recommended VSC of 27% by 3.9% and window 2 will also be reduced beyond the recommend 27% threshold, by 5.5%. Although both windows will be reduced, they will not be reduced beyond 0.8 times the former value so there will be no noticeable impact. Window 3 does not currently meet the recommended threshold of 27%, but it will not be reduced beyond 0.8 times its former value so again there will be no noticeable impact.

5.1.2 No Sky Line

The impact on daylight distribution within existing rooms can be assessed by plotting the No Sky Line (NSL) in each of the main rooms. BRE guidance states this should be undertaken where internal layouts are known. As the internal layouts of the properties are unknown, plotting the NSL has not been undertaken.

The Vertical Sky Component (VSC) results discussed in the previous section show that some of the assessed windows fall only slightly below the 27% threshold. This indicates that the shortfall is marginal and therefore unlikely to be noticeable.

5.2 ANNUAL PROBABLE SUNLIGHT HOURS

The BRE guidance outlines that the sunlight to an existing dwelling may be adversely affected if the centre of the window:

- receives less than 25% of annual probable sunlight hours and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;
- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

BRE guidance suggests that all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90° of due south.

As the layout of the properties is unknown, all the rear windows for 10 – 18 Prospect Place have been assessed. The APSH results are presented in Table 5.2, window references are given in Appendix 1.

The results demonstrate the sunlight to the windows assessed will remain unchanged with the proposed development.

Property	Window No.	Existing APSH %		80% Threshold		Proposed APSH %		BRE Guidance met?
		Annual	Winter	Annual	Winter	Annual	Winter	
10 Prospect Place	1	11.97	2.11	9.58	1.69	11.97	2.11	✓
10 Prospect Place	2	11.97	2.11	9.58	1.69	11.97	2.11	✓
10 Prospect Place	3	19.15	2.61	15.32	2.09	19.15	2.61	✓
10 Prospect Place	4	6.23	1.41	4.98	1.13	5.76	1.41	✓
12 Prospect Place	1	11.29	1.43	9.03	1.14	11.29	1.43	✓
12 Prospect Place	2	11.78	1.93	9.42	1.54	11.78	1.93	✓
12 Prospect Place	3	10.40	0.00	8.32	0.00	10.40	0.00	✓
12 Prospect Place	4	9.91	1.41	7.93	1.13	8.40	1.41	✓
12 Prospect Place	5	9.96	1.41	7.97	1.13	8.43	1.41	✓
12 Prospect Place	6	10.40	0.00	8.32	0.00	10.40	0.00	✓
14 Prospect Place	1	12.30	2.11	9.84	1.69	12.30	2.11	✓
14 Prospect Place	2	12.60	2.11	10.08	1.69	12.60	2.11	✓
14 Prospect Place	3	6.39	0.02	5.11	0.02	6.39	0.02	✓
14 Prospect Place	4	7.51	0.25	6.01	0.20	7.51	0.25	✓
16 Prospect Place	1	18.52	2.49	14.82	1.99	18.52	2.49	✓
16 Prospect Place	2	10.88	0.86	8.70	0.69	10.88	0.86	✓
16 Prospect Place	3	10.36	2.11	8.29	1.69	9.86	2.11	✓
16 Prospect Place	4	10.51	1.89	8.41	1.51	9.03	1.89	✓
18 Prospect Place	1	20.16	2.56	16.13	2.05	20.16	2.56	✓
18 Prospect Place	2	7.75	2.11	6.20	1.69	7.75	2.11	✓
18 Prospect Place	3	6.86	1.76	5.49	1.41	6.78	1.76	✓

Table 5.2 Annual Probable Sunlight Hours results

5.3 OVERSHADOWING

The BRE guidance states that the sunlight to a garden will be adversely affected if both of the following criteria are infringed upon:

- The area of garden that can receive 2 or more hours of direct sunlight on 21st March is reduced to below 50% of the total area.
- The total area of the garden that can receive 2 or more hours of direct sunlight on 21st March is reduced by 20% or more of the existing value as a result of the proposed development.

The results from the IES SunCast analysis, comparing the overshadowing for the existing and proposed situation for the adjacent gardens, are shown in Table 5.3. 12 Prospect Place and 14 Prospect Place are the only two properties that have courtyards, therefore the overshadowing has only been carried out at those two properties.

Garden	No. Hours >50% Of Garden Receives Direct Sunlight		Av. Area Receiving Direct Sunlight (Sqm)			BRE Impact Guidance Met?
	Existing	Proposed	Existing	80% Threshold	Proposed	
12 Prospect Place	0	0	0	0	0	✓
14 Prospect Place	0	0	0	0	0	✓

Table 5.3 Overshadowing results of adjacent gardens.

12 Prospect Place

The results show that there are 0 hours of existing direct sunlight, and this will remain unchanged with the proposed development.

14 Prospect Place

The results show that there are 0 hours of existing direct sunlight, and this will remain unchanged with the proposed development

5.4 INTERNAL DAYLIGHT

Internal daylighting calculations have also been carried out for the 4no. proposed penthouse flats in the development.

5.4.1 Model Properties

Table 5.4 details the reflectance values of the building materials in the daylight calculations. These are based in accordance with BRE guidance Clause C24 for the external walls and ceilings but with the addition of white internal walls and light wood floors internally.

Building Element	Colour	Reflectance
External Walls	As per BRE	0.2
Internal walls	White	0.7
Ceiling	As per BRE	0.7
Carpet	Light wood floors	0.4

Table 5.4 Construction material settings

The windows are set to have a frame of 15% applied and the overall light transmittance for the spatial daylight autonomy (sDA) calculation is 40%. This is because the calculation is required to include blinds which are considered closed for part of the day.

The internal daylight has been determined for the four flats. The results are presented in Table 5.5 which are presented against the BS EN 17037 minimum recommendations along with the UK National Annex minimum requirements for dwellings.

Flat No.	Room	BS EN 17037 Minimum Target Illuminance			National Annex NA.2 Minimum Target Illuminance for Dwellings		
		ET lux 300 lux for 50% assessment grid	E_{TM} lux 100 lux for 95% assessment grid	Guidance met?	ET lux for 50% assessment grid	% of reference plane	Guidance met?
Flat A	KLD	92	100	✓	200	100	✓
Flat A	Bedroom 1	47	74	✗	100	74	✓
Flat A	Bedroom 2	46	96	✗	100	96	✓
Flat B	KLD	100	100	✓	200	100	✓
Flat B	Bedroom 1	72	100	✓	100	100	✓
Flat C	KLD	100	100	✓	200	100	✓
Flat C	Bedroom 1	38	100	✗	100	100	✓
Flat C	Bedroom 2	54	100	✓	100	100	✓
Flat D	KLD	100	100	✓	200	100	✓
Flat D	Bedroom 1	43	100	✗	100	100	✓
Flat D	Bedroom 2	59	80	✗	100	80	✓

Table 5.5 Internal daylight results

Due to the nature of the proposed development being in a dense urban area it is the National Annex NA.2 targets that the building needs to meet.

The internal layout of the flats can be seen in Appendix 2.

The results show that all 4no. penthouse flats are BRE impact compliant as they all meet the National Annex NA.2 Minimum Target Illuminance for Dwellings.

6 CONCLUSIONS

This report has assessed the potential impact of the proposed development at 97-99 Montague Street, worthing on the surrounding residential properties.

The environmental impact to the adjacent properties, taking into account daylight, sunlight and overshadowing is as follows:

- 10 Prospect Place = Negligible Impact
- 12 Prospect Place = Negligible Impact
- 14 Prospect Place = Negligible Impact
- 16 Prospect Place = Negligible Impact
- 18 Prospect Place = Negligible Impact

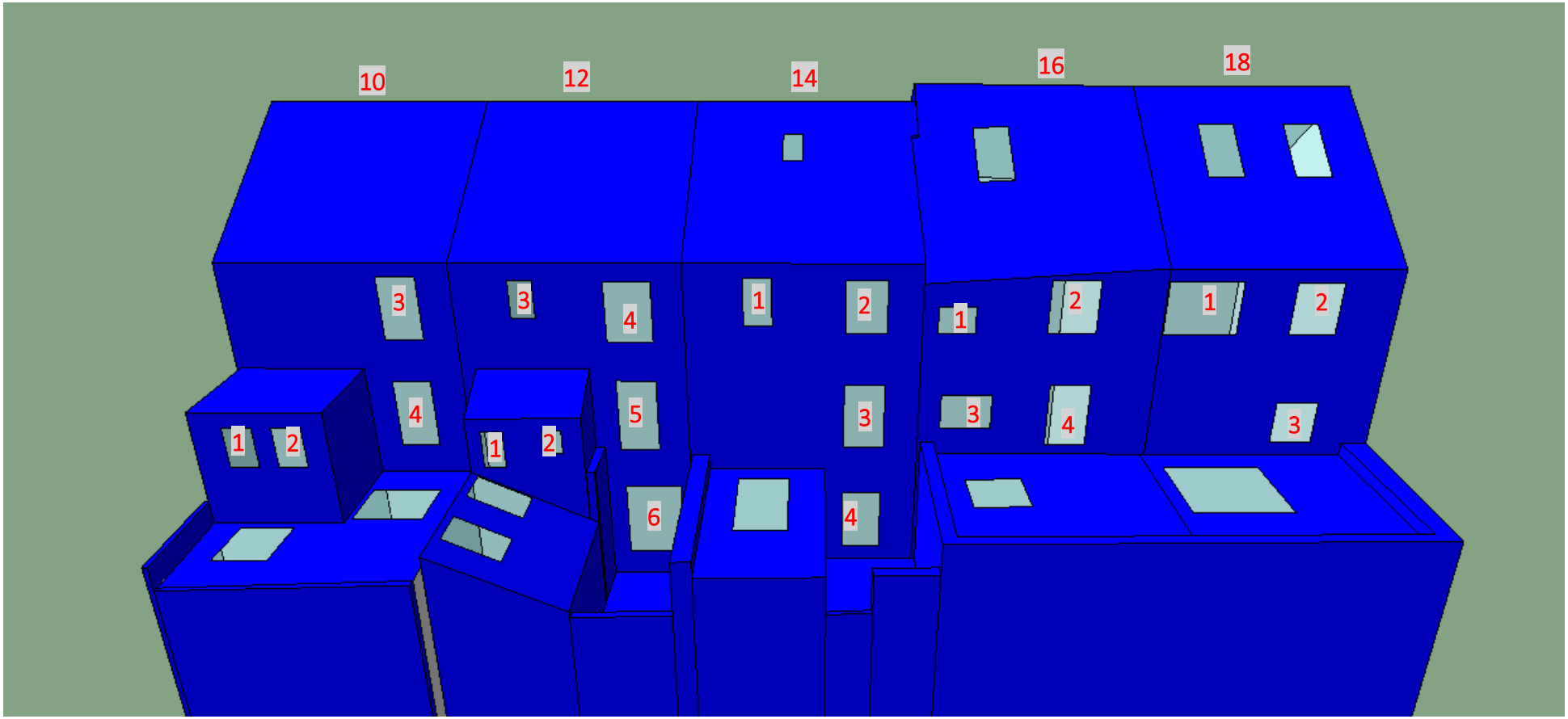
Therefore the study has demonstrated negligible impact to all surrounding properties and daylight should not be a reason for refusal on this scheme.

The study also demonstrates that the proposed penthouse flats will enable good daylight to be enjoyed throughout Flats A, B, C and D.

This study has been undertaken following the process outlined in the BRE Guidance document "BR 209: Site Layout Planning for Daylight and Sunlight, a Guide to Good Practice, 2022. The guidance states: *The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.*

7 APPENDIX 1 WINDOW REFERENCES

10 – 18 Prospect Place



8 APPENDIX 2 FLOOR PLAN